What will be the result if the two eyes have different motor-sensations? If you regard a rotating disk directly with one eye, and through a reversion prism with the other, you see opposite directions of rotation with the two eyes, giving rise to an uneasy feeling and no distinct after-image. If you close one eye you get its appropriate after-image. But most curious of all, if you look at the disk with one eye until fatigued, then close and look at a white surface with the *other* eye, you will see an after-image of the disk rotating in an opposite direction.

This holds equally well for the third dimension. A wheel rotating in the median plane is seen in the third dimension, and when suddenly stopped, the after-image is also seen in perspective. But this is obtained by a combination of the different after-images of the two eyes. A true after-image in the third dimension is not obtained. In the after-image only that portion of the nervous system is involved that aids in the perception of the adjacency of space impressions. In riding in the rear car of a train and looking backwards we see objects hurrying away from us. If the train stops we seem to be approaching the objects. In the former case the retinal impressions gradually grew smaller; now they by the after effect grow larger, and thus lead to the inference of our approaching them.

Again, it is found that if there is no stationary object in the field of vision, the minimum perceptible rate of motion is much raised; the threshold for motion becomes 10 times as high. It makes a difference whether the object moves across the retina or the eye follows the object across the field of vision; in the latter case the motion seems only about half as rapid as in the other. We have a more accurate notion of the motion of images on the retina resulting from the viewing of a stationary object while the eyes move, than we have of the motion of the eye muscles. If there is no object in the field of vision recognized as stationary, the perception of motion becomes vague; so in a dark room the movement of a light could hardly be seen.

We distinguish then between a sensation of motion which is immediate and is probably a subcortical function, and the conscious perception of motion by inference from various sensations.

*Experimentalle Untersuchungen zur Amblyopiefrage.* Dr. F. C. MÜLLER-LYER. Arch. f. Anat. u. Phys. 1887, p. 400.

Setting out with the idea of studying the phenomena of sight disturbed by disease, by studying normal sight as disturbed by experimental conditions, the author of this lucid article investigated four points, namely, (1) discriminative sensibility, (2) sharpness of vision, (3) color-sense, and (4) extent of the field of vision toward the periphery, in the three following conditions: (*a*) Simple weakness, (*b*) state of stimulation, (*c*) state following stimulation. Simple weakness of the eye can be paralleled for experiment by weakening the stimulus. The study of the first point under this condition is simply a retesting of Weber's law. After a set of careful experiments, the author found, as others have done, that Weber's law is not strictly exact. The discriminative sensibility is not constant, but depends on the intensity of the stimulus. The nearest mathematical expression for it (and that only an approximation) is that the former varies as the cube root of the latter. The second point was

tested with printed letters, with the result of finding that the sharpness of vision follows in its decline essentially the same curve as the discriminative sensibility, but declines a little more slowly at first and a little more rapidly at last. The experiments on the third and fourth points coincide with the usual results, namely, that the limits of vision for green and red are first contracted, then those for yellow and blue; and the colors are finally lost in the same order, while the field for white remains uncontracted even with very considerable darkening. When the eye is stimulated from a source of light between itself and the object upon which it is fixed (condition *b*), it is found that when the extra stimulation increases in intensity, the discriminative sensibility declines more rapidly than the sharpness of vision, and that the disturbance of vision increases as the illumination of the fixated object is reduced, showing the eye thus stimulated to be delicately hemeralopic. Under such extra stimulation the visual field for white is concentrically contracted, the contraction depending in its amount, while the extra stimulus is constant, on the illumination of the object. The colors have their fields contracted and disappear in the order of their brightness, though this is not that of the extent of their fields in normal vision; blue, which then has next to white the widest field of all, may, under the influence of the extra stimulation, disappear, while all the other colors, except violet, are still to be seen. The results for the eye after stimulation (condition *c*) agree with those just given for condition *b*, except that with daylight illumination of the object fixated, colored vision is introduced (especially red-seeing and green-seeing), which brightens one color to the disadvantage of its contrasting color. For the diseases of vision with which the above conditions are comparable, as for the details of the apparatus and methods used in the experiments, the article itself should be consulted.

*Die Umkehrung des Sehens und des Gesehenen mit Beziehung auf die gleichzeitige Seh-Abprägung.* Prof. HOPPE. Pflüger's Archiv, XLIII, 1888, p. 295.

The "conversion of relief" in plane drawings, as in that which appears to be a half-open book, now seen from behind and now from in front, or like the Schroeder stair figure, has generally been explained as due to a change of conception in the mind of the observer, or to that helped out by ocular motion. Prof. Hoppe finds an additional factor in differences of the impression (*Abprägung*) of the image on the *macula lutea*. He presses the nativistic argument so far as to suggest that the *macula lutea*, in a certain way and to a certain degree, *knows* its own images. For proofs of his position the article itself must be consulted.

*On Wundt's Theory of Psychic Synthesis in Vision.* J. H. HYSLOP, Ph. D. Mind, XIII, p. 499, Oct. 1888.

After a preliminary explanation of the apparent location of stereoscopic images, Dr. Hyslop quotes Wundt's theory of psychic synthesis with qualified approval, and gives several interesting experiments (for the most part given in his letters to *Science* in the early part of this year) that in a measure confirm that theory. He finds in it, however, a confusion of two conceptions of innervation; the first